

# PROBIOTIC USE ON IBS SYMPTOMS

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## Probiotic Use and their Effect on IBS Symptoms: A Review of Literature

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### **Abstract**

**Aim:** Probiotics are an attractive therapy for patients dealing with irritable bowel syndrome (IBS) in light of decreased financial costs, fewer medications, and a more natural approach. In this review of literature our purpose was to answer the following PICO question: “In adults with IBS, how does supplemental probiotic use compared to no probiotic use affect IBS symptoms?”

**Methods:** In our review of the literature, the databases searched were CINAHL, MEDLINE, Cochrane, PubMed, Google Scholar, and Onesearch from the years 2008-2018; from which we found ten articles published within the last six years.

**Results:** Seventy percent of the articles reviewed for our research identified that both the experimental (probiotic) and control (placebo) groups showed equal significant improvement in the management of IBS symptoms. Sixty percent of our articles studying multispecies versus monospecies probiotic therapy observed a greater therapeutic response when using probiotics in combination rather than individually. Lastly, 60% observed a therapeutic response in the reduction of IBS symptoms.

**Conclusion:** The results of our review indicated that there was significant evidence for the use of probiotics in alleviating symptoms of IBS. However, the benefit of probiotics was equal to that of the placebo or not significantly greater. Therefore, we concluded that a pilot of change in practice should be considered, but there is still a need for further investigation on this topic.

**Keywords:** Probiotics, Efficacy, Irritable Bowel Syndrome, Treatment, Management, Therapeutic, Effective.

## Probiotic use and their effect on IBS symptoms: A Review of Literature

### Introduction

According to the National Institute of Diabetes and Digestive and Kidney Diseases, “Irritable bowel syndrome (IBS) is a group of symptoms that occur together, including repeated pain in your abdomen and changes in your bowel movements, which may be diarrhea, constipation, or both. With IBS, you have these symptoms without any visible signs of damage or disease in your digestive tract” (Definitions and Facts for Irritable Bowel Syndrome, 2017). In addition to this, there are three forms of IBS, “diarrhea (IBS-D), constipation (IBS-C), or both (IBS-M)” (Canavan et. al., 2018). Some of the symptoms of IBS include abdominal pain (which is often associated with bowel movements), frequent loose stools, bloating, stool consistency, cramping, flatulence, and an unusual number of bowel movements a day.

Diagnoses are made by the presence of symptoms, consulting family/medical history, physical examination, and diagnostic tests. The most commonly used tool for diagnosing IBS is the ROME III tool, which focuses on symptom duration, abdominal pain, stool frequency and consistency, and whether relief is obtained by defecation. Treatments for IBS include lifestyle changes, medications, and mental health therapies. The incidence of IBS symptoms is 67 per 1000 person-years, whereas an actual diagnosis is estimated to sit closer to two per 1000. The prevalence of IBS morbidity is estimated at 11.2% worldwide. Those with IBS do not have an increased mortality risk as compared with others without IBS (Canavan et. al., 2014). The financial impact of IBS in the United States ranges between \$742 and \$7547 (Canavan et. al., 2018). Because of the financial impact and unexplained physical discomfort which results in social and emotional struggles, the treatments offered to IBS patients should be examined for their efficacy.

### **PICO Question**

This article addresses the following PICO question: “In adults with IBS, how does supplemental probiotic use compared to no probiotic use affect IBS symptoms?” The population of our question included adults with IBS. Our intervention was supplemental probiotic use, which was being compared with no probiotic use, and the outcome of interest was the effect on IBS symptoms. The three most important terms in this question are as follows: IBS, probiotics, and IBS symptoms. Probiotics are live microorganisms which have been demonstrated to exhibit potential effects on human health.

### **RN Interview**

In order to gain a better understanding of the standard current practice regarding probiotics and their use in IBS, we interviewed an ortho/neuro nurse working in a county hospital. According to the RN, there was no direct standard of practice that she knew of at her work that addressed the use of probiotics as a treatment for IBS. However, her hospital’s institute of policy does state that whenever a patient is on antibiotics they are to be automatically put on a probiotic. The rationale for probiotic use is that it acts as a preventative against C. Diff that may result from overuse of antibiotics and also can help prevent IBS symptoms that may occur.

### **Methods**

In our review of literature, the databases searched were CINAHL, MEDLINE, Cochrane, PubMed, Google Scholar Advanced Search, and Onesearch from the years 2008-2018. In order to obtain the most accurate results, we included the keywords: IBS, Probiotics, Efficacy, IBS management, Irritable Bowel Syndrome, and Treatment. To narrow the results further, we used the inclusion criteria of adult population studies, where study subjects were showing symptoms

of IBS, and the full text of the article was available. In addition to these criteria, the articles selected were from scholarly sources, and available in English. The exclusion criteria we implemented included research that was irrelevant to our PICO question, study participants that had been on probiotics shortly prior to the study, article unavailable in full text, and articles in a language other than English (See Table 1 below for reference).

***Table 1: Results of Refined Searches for Patient Safety Sources***

<b>Database Searched</b>	<b>Date of Search</b>	<b>Search Terms and Strategy</b>	<b>Years</b>	<b>No. of Sources Found</b>
CINAHL	10/05/2018	Probiotics, IBS, Full text	2008-2018	81
CINAHL	10/05/2018	Probiotics, IBS, Full Text	2013-2018	81
MEDLINE	10/05/2018	Probiotics, IBS, Full Text	2013-2018	178
MEDLINE	10/05/2018	Probiotics, IBS, Full Text	2013-2018	178
MEDLINE	10/05/2018	Efficacy, Probiotics, IBS, Full Text	2010-2018	77
Cochrane	10/25/2018	Probiotics, Irritable Bowel Syndrome, Full Text	2013-2018	99
PubMed	10/05/2018	IBS, Probiotics, Free full text, Humans, English	2013-2018	60
Google Scholar Advanced Search	10/23/2018	Probiotics, Irritable Bowel Syndrome, Treatment	2013-2018	12
Onesearch	10/22/2018	IBS Management, Probiotics, Academic Journals, Full text, scholarly (peer-reviewed) journal, available in the library collection, Subject: Irritable Bowel	2013-2018	9

		Syndrome, Probiotics, Therapeutic use of probiotics, English		
CINAHL	11/01/2018	IBS, probiotic, effective, full text	2008-2018	16

### Results

We reviewed and critically appraised ten research articles using the John Hopkins appraisal tool. Eight of which met the criteria for level one evidence, while the remaining two were evidence level five. The overall quality for both level one and level five articles represented good quality. Out of the ten articles we reviewed for our research, 80% were quantitative. Within the 80%, 50% were RCTs and the remaining 30% were systematic reviews (one with a meta-analysis) and one meta-analysis. The articles not included within the 80% were expert's opinion on the subject. The sample size from our articles ranged from N=21 to N=1793 with three of the studies using a sample size under N=100. The systematic review without meta-analysis and the two expert opinions did not include a sample size in their article. In the 10 articles selected for this study, 50% included the setting in which the original research took place. These included: hospitals, medical university clinics, and medical centers (see Appendix G). All of the articles selected for review were published between the years 2012-2017 and were from outside of the United States.

### Level 1

**Probiotic vs. placebo.** In the ten articles we reviewed, 50% of the studies found that there was a positive correlation between the probiotic treatment group and the placebo-controlled group. Meaning either the symptoms of IBS improved equally or there was not an improvement in the overall symptoms of IBS with both the experimental (probiotic) and control group (placebo) (Hod et al., 2017; Ludidi et al., 2014; Lyra et al., 2016; Mazurak, Broelz, Storr, Enck,

2015; Zhang et al., 2016). Forty percent of our research suggests that we may not see an increase in IBS symptom management with probiotics due to the strong placebo effects that mask any therapeutic response to the probiotic (Hod et al., 2017; Ludidi et al., 2014; Han, Wang, Seo, Kim, 2016; Lyra et al., 2016). Twenty percent of the articles stated that there was no significant use for probiotics in the management of IBS (Hod et al., 2017; Mazurak et al., 2015).

However, not all researchers came to the same conclusion. Thirty percent of our articles that directly address probiotic versus placebo, state that there was a significant difference between the experimental and control group. The significance can be observed most directly in the reduction of pain and quality of life (Mezzasalma et al., 2016; Didari et al., 2015; Mazurak et al., 2105).

**Symptom relief.** Sixty percent of the articles observed a therapeutic response in the reduction of flatulence, bloating, abdominal pain, constipation, and cramps; with an emphasis on reduction of bloating (Mezzasalma et al., 2016; Ludidi et al., 2014; Didari et al., 2015; Han et al, 2016; Lyra et al., 2016; Mazurak et al., 2015). Within the 10 articles selected for our review, the short-term use of probiotics versus long-term was more effective in the reduction of IBS symptoms with probiotic therapy (Didari et al., 2015; Mazurak et al., 2105; Zhang et al., 2016). For example, in the systematic review, approximately 50% of the trials resulted in an increased reduction of global IBS symptoms, particularly bloating, when taking probiotics for an average of four weeks compared to those who took it long-term (Mazurak et al., 2015).

**Multispecies vs. monospecies.** Three out of the four of our articles studying multispecies versus monospecies probiotic therapy observed a greater therapeutic response when using probiotics in combination rather than individually (Mezzasalma et al., 2016; Hod et al., 2017; Didari et al., 2015). However, there was an article reviewed for this research, that revealed the

significance of bifidobacteria as a possible probiotic therapy. As evidenced by its positive to negative test ratio of 4:2. This indicated that bifidobacteria, single-strain probiotic may be a clinically relevant treatment option in IBS symptom management (Mazurak et al., 2105). In addition, another study focused on bifidobacteria as a treatment and observed a negative correlation between bifidobacterium and urgency defecation (Han et al., 2016). However, the increased advantages of multispecies compared to monospecies probiotic for IBS patients are still inconclusive (Mazurak et al., 2015; Zhang et al., 2016).

### **Level 5**

As seen in level one, placebo effects cannot be excluded as affecting the accuracy of the results (Philips, 2012). In this review of literature, experts agreed that probiotics were a reasonably safe therapy and could be considered as an adjunct to IBS management (Philips, 2012; Bixquert, 2013). Lactobacillus and Bifidobacteria were identified as key probiotics used in IBS. The literature indicates that different strains in adequate amounts are more effective in treating different symptoms of IBS (Phillips, 2012; Bixquert, 2013). However, there remain inconsistencies in research and further research needs to be done addressing gaps within the literature (Philips, 2012; Bixquert, 2013).

### **Summary**

Within the limits of the 10 articles that we reviewed for this literature, there was a consistent theme. When discussing the topic for the use of probiotics in the management of IBS symptoms, there was a need for more controlled trials to alleviate confusion between inconsistencies in the current research (Mezzasalma et al., 2016; Hod et al., 2017; Ludidi et al., 2014; Didari et al., 2015; Lyra et al., 2016; Mazurak et al., 2015; Zhang et al., 2106; Philips,



2012; Bixquert, 2013). Therefore, based on our analysis using Appendix H, we concluded that the overall strength of the evidence is good quality but conflicting.

### **Discussion**

In this review of literature, we addressed the following PICO question: “In adults with IBS, how does supplemental probiotic use compared to no probiotic use affect IBS symptoms?” To facilitate this review of literature, 10 articles were critically appraised (see appendix E), the results of the evidence appraisal were documented (see appendix G), and the findings of the articles were synthesized (see appendix H). In addition, an RN was interviewed about the current standard of practice regarding probiotics and the treatment of IBS symptoms.

### **Recommendations**

From the analysis we conducted in appendix H, we were able to determine the following conclusions and evidence-based recommendations for practice. The results of our review indicated that there was significant evidence for the use of probiotics in alleviating symptoms of IBS. However, the benefit of probiotics was equal to that of the placebo or not significantly greater (Hod et al., 2017; Ludidi et al., 2014; Lyra et al., 2016; Mazurak, Broelz, Storr, Enck, 2015; Zhang et al., 2016). In addition, seven out of the 10 articles reviewed concluded that there is a need for further clinical studies due to inconsistencies in the results (Mezzasalma et al., 2016; Hod et al., 2017; Ludidi et al., 2014; Didari et al., 2015; Lyra et al., 2016; Mazurak et al., 2015; Zhang et al., 2016). Therefore, based on this analysis and synthesis of findings, the evidence suggests that a pilot of change in practice should be considered regarding the use of probiotics in treating IBS symptoms. In addition, there is a need for further investigation and supporting evidence.

### **Limitations**

This review of literature included limitations, one of them being that there were only 10 articles reviewed and appraised for this research. Of the ten articles critically appraised, 20% of them were only level five expert opinions (see appendices F) which may be biased by personal opinion of the authors. It is possible in our review of literature that some relevant studies were not identified or included. In addition, none of the included studies were conducted in the setting of the U.S. which may affect the generalizability of results to the American population.

### **Implications for practice**

Based upon our review of literature, a pilot of change in practice should be considered. However, there is still a need for increased consistency in research results, particularly on key probiotics such as *Lactobacillus* and *Bifidobacteria*. It was suggested in two of the articles that further research should focus on the type, optimal dose of probiotics and the subgroups of patients who likely benefit the most, treatment duration, and strain (Mazurak et al., 2015; Zhang et al., 2016). Despite the inconsistencies in research, probiotics are considered a reasonably safe trial intervention as they have been found to improve the symptoms of IBS (Han et al., 2017; Ludidi et al., 2014; Lyra et al., 2016; Mezzasalma et al., 2016; Didari et al., 2015; Mazurak et al., 2015).

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